

CLASS 87, TEXTILES: BRAIDING, NETTING, AND LACE MAKING

SECTION I - CLASS DEFINITION

Processes and apparatus for forming strands or fabrics from yarns, filaments or strands, by braiding, knotting and/or intertwisting the strands; and the corresponding products or fabrics.

SECTION II - LINES WITH OTHER CLASSES AND WITHIN THIS CLASS

The line between this Class 87 and Class 428, Stock Material or Miscellaneous Articles, is that any plural layer product or stock material which includes a component classifiable in this class (87) will be placed in this class; a plural layer stock material or product in general with no structure of the Class 87 type will be classified in Class 428, Stock Material or Miscellaneous Articles. See also reference to Class 87 in the main definition of Class 428, Lines With Other Classes, Intermediate Articles, and subclass 592 for metallic stock material having a helical component.

SECTION III - REFERENCES TO OTHER CLASSES

SEE OR SEARCH CLASS:

- 112, Sewing, subclass 415 for braid, netting or lace which includes stitching.
- 427, Coating Processes, for processes of coating, per se, not combined with a textile operation.
- 140, Wireworking, subclasses 3+ for machines and processes of the type found in this class (87), combined with some additional wireworking apparatus or process step. Where wires are not interlooped by merely being placed adjacent each other and then locally twisted to overlies, so that only the rigidity of the wire holds them together, the patent is in Class 140, Wireworking.
- 174, Electricity: Conductors and Insulators, particularly subclass 121, 122 and 124 for insulated conductors and see the class definition, (3) Note, for the line.
- 245, Wire Fabrics and Structure, particularly subclass 7 and 8 for wire fabrics even though for a structure provided for in this class (87) having claimed additional features of wire fabric structure.

- 156, Adhesive Bonding and Miscellaneous Chemical Manufacture, subclasses 148+ for the combination of laminating and braiding and subclass 52 for indefinite length conductor making including a step of braiding a covering thereon.

SUBCLASSES

- 1 This subclass is indented under the class definition. Processes, involving the applying of a coating or impregnating material to the product by application to the strand material at any time (i.e., before, during and/or after) relative to the mechanical interrelation of the strands; and the resulting products.
 - (1) Note. Subclasses 5+ for the incorporation of materials other than coating or impregnating materials, particularly subclass 6 where the tubular fabric is formed about a soft core into which it may become embedded.
 - (2) Note. This class, subclass 23 for apparatus involving means for coating or impregnating.

SEE OR SEARCH CLASS:

- 156, Adhesive Bonding and Miscellaneous Chemical Manufacture, subclass 51 and 148 for combinations of braiding and laminating.
- 427, Coating Processes, for processes of coating, per se, not combined with a textile operation.
- 428, Stock Material or Miscellaneous Articles, appropriate subclasses for a stock material product in the form of a single or plural layer web or sheet when the strand interrelation for this class (87) is not recited. See also main class definition of Class 428, section VI A 1 (3) for a further statement of the line.

- 2 This subclass is indented under the class definition. Processes for making the fabric is extensible either longitudinally, transversely or both due to the presence therein of extensible elements; and the resulting products.

- (1) Note. Fabrics that are merely resilient under compression are not here included.
- SEE OR SEARCH CLASS:
57, Textiles: Spinning, Twisting, and Twining, subclass 216, 220, 222 and 362.
139, Textiles: Weaving, subclasses 421+.
- 3** This subclass is indented under the class definition. Processes involving twisting strands together and/or intertwisting strands at different points of junction; and the resulting products.
- (1) Note. This class, subclass 10 for processes of braiding in which arresting carrier motion or other braiding operations cause a strand to pass one or more times about another strand; and the resulting products.
- (2) Note. This class, subclasses 24+ for corresponding apparatus.
- 4** This subclass is indented under subclass 3. Processes wherein the meshes of a net or mesh fabric are formed by intertwisting the strands, the individual strands comprising one of the two strand sets never being intertwisted; and the resulting products.
- (1) Note. These fabrics are distinguished from braided lace by virtue of the fact that certain threads, known as warp, spool, beam, etc., threads, are not intertwisted but may be tied together or in position at certain points by means of the bobbin threads, with which they are intertwisted.
- (2) Note. This class, subclass 27 for corresponding apparatus and see the definition thereof for a further statement.
- 5** This subclass is indented under the class definition. Processes claiming steps for incorporating material in the fabric in diverse ways; and the resulting products. This may be by combining two or more types of fabric provided for in this class, or one fabric of this class with other material incorporated by other characters of operation. The same strands may be interrelated in two or more different ways.
- (1) Note. In general the material incorporated is independent of the base fabric and does not partake of the fabric forming operations. Also, it may be material of a different character uniting two or more fabrics made according to the methods of this class.
- (2) Note. This class, subclass 1 for coated or impregnated fabrics.
- (3) Note. This class, subclasses 28+ for corresponding apparatus.
- 6** This subclass is indented under subclass 5. Processes in which the fabric is formed about a core, which becomes part of the completed structure; and the resulting products.
- 7** This subclass is indented under subclass 5. Processes in which braided material and unbraided material are incorporated in a fabric; and the resulting products.
- (1) Note. The unbraided material is usually held in or to the fabric by the braided strands.
- (2) Note. Where the unbraided material is the core of a substantially tubular fabric, see subclass 6.
- 8** This subclass is indented under the class definition. Processes involving the braiding of strands together, i.e., in which one or more strands pass alternately over or under one or more other strands; or in which one or more strands half-twist alternately about two or more adjacent strands; and the resulting products.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
33+, for corresponding apparatus.
- SEE OR SEARCH CLASS:
24, Buckles, Buttons, Clasps, etc., subclasses 659+ for braids formed into button-hole loops.
245, Wire Fabrics and Structure, subclass 7 and 8 for related wire fabrics.

- 277, Seal for a Joint or Juncture, for a generic sealing means or process, subclass 537 for a dynamic, circumferential, contact seal for other than a piston contained or compressed by a gland in a packing box having braided, woven, or twisted material or construction.
- 9** This subclass is indented under subclass 8. Processes involving forming a tubular, though not necessarily cylindrical fabric; and the resulting products.
- 10** This subclass is indented under subclass 8. Processes involving forming a fabric of the well know open work or net construction commonly provided with integral surface patterns or designs, which are formed either by open work differing from the ground fabric, or by portions more dense than the ground fabric.
- (1) Note. While these fabrics are inherently variation type, they are here collected on the basis of pattern or design variation, whereas those in subclass 11 are classified on the basis of fabric outline variation.
- (2) Note. Subclasses 3+ for other fabrics having a strand passing one or more times about another strand where the fabric is formed by other than a braiding operation.
- 11** This subclass is indented under subclass 8. Processes wherein the outline of the fabric (as distinguished from its pattern due to strand spacing, color, etc.) is varied; and the resulting products.
- (1) Note. This may be by forming projections, eyes or apertures (other than as defined in subclass 10), furcations, by the addition or subtraction of strands, etc.
- 12** Processes involving forming a fabric by tying knots at the junction points of the strands; and the resulting products.
- (1) Note. The fabric may be of single or plural strand construction.
- 13** Processes and products not specifically provided for above.
- 14** This subclass is indented under the class definition. Apparatus in which a pattern mechanism (such as a jacquard, a pattern sheet, cam mechanism, etc.) is used to control operation of the machine for any purpose, such as to produce a design on or to control the shape of a fabric.
- (1) Note. For other pattern mechanisms, see the index to classification of patents, the title "Pattern and Pattern Control".
- 15** This subclass is indented under subclass 14. Apparatus utilizing electrical or fluid operated means.
- 16** This subclass is indented under subclass 14. Apparatus in which the travel of the braiding carriers is governed by movable switches under the control of the pattern means.
- (1) Note. This class, subclasses 37+ for such machines without pattern mechanism.
- 17** This subclass is indented under subclass 14. Apparatus in which certain braiding carriers may be stopped in their travel, in predetermined sequence, and then permitted to resume travel, such stopping and resumption of travel being under the control of the pattern mechanism.
- (1) Note. This class, subclasses 39+ for such machines without pattern mechanisms.
- 18** This subclass is indented under the class definition. Apparatus provided with means, either automatically or manually controlled, for either or both stopping or starting the entire apparatus. Apparatus wherein the operation is initiated by means which sense a condition of a strand, such as absence of abnormal tension are here classified.
- SEE OR SEARCH CLASS:
192, Clutches and Power-Stop Control, subclasses 116.5+, particularly subclasses 125+ for stop mechanism not restricted to apparatus for this class (87).

- 226, Advancing Material of Indeterminate Length, subclass 43 for devices that stop movement of material advances upon sensing position of material.
- 19** This subclass is indented under subclass 18. Apparatus wherein the strand condition detecting means operate through electrical means to cause the stopping.
- (1) Note. The strand condition detector may be an element of a switch or may operate through other elements to effect operation of an electrical means.
- SEE OR SEARCH CLASS:
- 192, Clutches and Power-Stop Control, subclass 127 for material controlled electrically operated power stop devices.
- 20** This subclass is indented under the class definition. Apparatus provided with means that will sense a condition or change of condition; and will then effect the operation of some other device or portion thereof.
- (1) Note. An example is where the operation of the machine or a portion thereof is governed by strand or fabric tension.
- (2) Note. Subclasses 14+ for pattern mechanism control.
- (3) Note. Subclasses 18+ for automatic control of starting or stopping.
- SEE OR SEARCH CLASS:
- 226, Advancing Material of Indeterminate Length, subclass 10 for devices that sense and control accordingly the movement of material of indeterminate-length.
- 21** This subclass is indented under subclass 20. Apparatus, wherein the automatic control governs the paying out of the supply on strand carriers by releasing the carrier for free rotation.
- (1) Note. The devices in this subclass are those wherein brakes and analogous devices are regulated for the most part by strand tension.
- 22** This subclass is indented under subclass 21. Apparatus wherein the carrier is provided with a ratchet or ratchet-like device that prevents unwinding of the supply except under the operation by the automatic control (usually by tension of the strand itself).
- (1) Note. Discs or drums with pins or holes and holding means coating therewith are considered ratchet-like devices.
- 23** This subclass is indented under the class definition. Apparatus having means for applying a coating or an impregnating material to the strands and/or to the fabric at any time relative to the production of the fabric.
- (1) Note. The coating or impregnating material may be a non-plastic plasticizeable material which, at some stage of manufacture, or subsequently, is rendered plastic.
- (2) Note. This class, subclass 1 for corresponding processes and products.
- SEE OR SEARCH CLASS:
- 118, Coating Apparatus, appropriate subclasses for coating apparatus, per se.
- 24** This subclass is indented under the class definition. Apparatus for producing fabric structure by twisting together strands and/or intertwisting strands at junction points, to form mesh, net or lace type of fabric.
- (1) Note. These devices for the most part produce polygonal mesh fence fabrics.
- (2) Note. This class, subclasses 3+ for corresponding processes and products.
- 25** This subclass is indented under subclass 24. Apparatus which may be moved from place to place or which may move along the floor or ground during fabric production.
- (1) Note. These devices for the most part are designed to produce wire fences in situ.
- 26** This subclass is indented under subclass 25. Apparatus including means to incorporate in the product some material (of strand or other

- form) in addition to the strands that are inter-twisted to form the fabric.
- (1) Note. The intertwisted strand fabric would be complete without the additional strands.
 - (2) Note. This class, subclasses 28+ for other such combinations.
 - (3) Note. This class, subclasses 33+ for braiding machines capable of causing a strand to pass one or more times about another strand by a braiding operation, particularly subclasses 37+ and subclasses 39+.
- 27** This subclass is indented under the class definition. Apparatus for producing fabrics such as tulle, curtain lace, etc. These machines are of the general type of Levers or go-through lace-machines. A plurality of thin shuttles or “carriages” containing shuttles and/or bobbins passed transversely across a plurality of longitudinal threads including warp, spool, beams, etc. threads. By a lateral shogging of either the carriages or the warp threads, one or more carriage spaces between successive carriage passages, the bobbin threads twist about the warp threads and ties them together or in place at predetermined points to form the lace pattern. There is no intertwisting of the longitudinal warp, etc. threads.
- (1) Note. This class, subclass 4 for corresponding processes and products.
- 28** This subclass is indented under the class definition. Apparatus including means to incorporate in the product some material (of strand or other form) which does not partake of the movements of interrelating of the strands forming the fabric.
- (1) Note. In general, the fabric basically produced is complete without the incorporated material.
 - (2) Note. Incorporating independent selvage strand in a fabric is classified here.
 - (3) Note. This class, subclass 1 and subclasses 5+ for corresponding processes
- and products; subclasses 23 and 26 for other apparatus combinations.
- 29** This subclass is indented under subclass 28. Apparatus for forming a substantially tubular fabric about a core which becomes a part of the complete fabric.
- (1) Note. This class, subclass 6 for corresponding processes and products.
 - (2) Note. This class, subclass 34 for devices which form a fabric about a mandrel.
- SEE OR SEARCH CLASS:
139, Textiles: Weaving, subclass 457 and indented subclasses, for circular progressive shedding weaving machines.
- 30** This subclass is indented under subclass 28. Apparatus which include means for introducing strands or other material into a braided fabric, which strands or other material do not partake of the movements which effect the braiding of the fabric.
- (1) Note. These strands may be “warps”, fillers, stuffers, independent selvage strands, etc.
 - (2) Note. This class, subclass 7 for corresponding processes and products.
- 31** This subclass is indented under the class definition. Apparatus for forwarding the completed fabric through the machine and/or for winding it up.
- SEE OR SEARCH CLASS:
242, Winding, Tensioning, or Guiding, subclasses 520+ for convolute winding in general.
- 32** This subclass is indented under the class definition. Apparatus claiming characteristics in addition to the features necessary to the feeding of the strand material, the interrelation thereof and the appropriate mechanism for operating the machine; and not provided for in the preceding subclasses.
- (1) Note. For example, here are collected, as originals and cross references, combinations with gauges, signals or indica-

- tors, cutters, lubricators, dust shields, oil shields, etc.
- 33** This subclass is indented under the class definition. Apparatus for forming strands or fabrics by the operations commonly known as “braiding” or “plaiting”. Bobbins, or carriers having bobbins thereon, are caused to travel in predetermined paths and they either pass each other so as to interlace strands, or strands leading from certain bobbins are caused to pass other bobbins to cause interlacing of the strands.
- (1) Note. The May-pole dance is a well known example of the basic operation of braiding. Some simple braiding mechanisms are known as May-pole braiders.
- SEE OR SEARCH CLASS:
139, Textiles: Weaving, subclass 457 and indented subclasses for circular progressive shedding weaving machines.
- 34** This subclass is indented under subclass 33. Apparatus having fixed or moving guiding devices over which a braid, or some portion thereof, is formed and from which it is subsequently removed. These devices merely maintain the form of the braid during the braiding operation.
- (1) Note. Such part may be so formed as to effect an additional shaping function.
- 35** This subclass is indented under subclass 33. Apparatus which condense and compact the fabric and/or give it a permanent set or form, during production
- (1) Note. See subclass 29 for forming tubular or tube-like braids about a core and subclass 34 for forming about a subsequently removed mandrel that drapes the same.
- 36** This subclass is indented under subclass 33. Apparatus having means for pushing or laying the interrelated strands properly into the fabric.
- (1) Note. Combinations of beat-up means with intertwisted strand type and knotted mesh type machines are also found in subclass 24 and indented subclasses and subclass 53.
- 37** This subclass is indented under subclass 33. Apparatus including movable controllers mounted adjacent the path of traveling carriers for directing the carriers in diverse predetermined paths.
- (1) Note. For pattern control of such apparatus, see subclass 16.
- 38** This subclass is indented under subclass 37. Apparatus in which the switches are moved by one carrier to direct a following carrier or an oppositely moving carrier in its proper path.
- 39** This subclass is indented under subclass 33. Apparatus having means for withdrawing certain carriers from their normal paths and holding them out of operation, or for stopping certain carriers during the operation of other carriers.
- (1) Note. For pattern control of such apparatus, see subclass 17.
- 40** This subclass is indented under subclass 39. Apparatus in which each carrier operating or propelling device is provided with an individual clutch device to couple it to the driving mechanism of the braiding machine.
- (1) Note. For pattern control of such apparatus, see subclass 17.
- 41** This subclass is indented under subclass 33. Braiding apparatus in which (1) means are provided for braiding a fabric having other than uniform characteristics (as by having different appearance braid in different areas, having specially-formed apertures, having branches, etc.) or (2) having means to change the braiding operation to produce braids of different appearance even though the disclosure is that any single produced fabric is to be of uniform appearance.
- (1) Note. Appropriate preceding subclasses for particular combinations or types of apparatus within this definition, particularly subclass 14 and indented subclasses, for pattern control combinations; subclass 37 and indented subclass, for machines having switches; and subclass

- 39 and indented subclass, for those having arrestable carriers.
- 42** This subclass is indented under subclass 33. Apparatus in which all carriers travel in the same directions about an axis and in which (1) each carrier is additionally moved in such a path as to travel alternately about two adjacent carriers; or (2) strands leading from certain carriers are passed alternately about certain other carriers adjacent to the path of movement of such strands. The carrier travel about the axis of the fabric twists all strands about such axis.
- (1) Note. Braiding apparatus producing interlocked strand type fabrics without the twist are in subclass 33.
- 43** This subclass is indented under subclass 33. Apparatus in which certain carriers travel in predetermined reciprocatory paths across the path of travel of carriers travelling in orbital paths.
- 44** This subclass is indented under subclass 33. Apparatus in which the carriers are divided into two or more sets or groups all traveling in concentric circular orbits and in which strands from one set are guided in and out about the carriers of another set, means being provided to permit free passage of such strands during travel of the carriers.
- 45** This subclass is indented under subclass 44. Apparatus in which the carriers of one set are provided with interrupted rack and gear driving means to permit passage of threads from another set about such carriers.
- 46** This subclass is indented under subclass 44. Apparatus in which the carrier driving means of one set of carriers is provided with two or more “pushers” alternately engaging a carrier to propel it and to permit passage of strands about the carrier.
- 47** This subclass is indented under subclass 46. Apparatus in which the “pushers” rotate to engage the carriers.
- 48** This subclass is indented under subclass 44. Apparatus claiming the means for deflecting the strands leading from one set of carriers in and out past a second set of carriers.
- (1) Note. The organized machine should not be claimed. Where any features of organization or structure not common to all machines of this type are claimed, the patent is placed in the appropriate preceding subclass; i.e., this subclass takes those means providing for strand deflection, per se, or in combination with a broad statement of general known types of machine organization.
- (2) Note. Since strand deflection is a necessary feature of all machines of this type, search on this subcombination must be completed in subclass 44 and the other indented subclasses.
- 49** This subclass is indented under subclass 33. Apparatus including means to prevent twisting or to cause untwisting of a strand leading from a carrier as it is laid into the fabric (so that, for example, a flat strand may be laid always with the same side out).
- 50** This subclass is indented under subclass 33. Apparatus including the means for causing braiding carriers to travel in predetermined intersecting paths. This subclass includes, for example, raceways, horn gears, fixed guides and other means for causing such travel, not elsewhere provided for.
- (1) Note. Carrier guiding and propelling in subclass 42 for interlocking twist type and in subclasses 44-47 for circular orbit type.
- (2) Note. For this subject matter combined with switches search subclass 16 and subclass 37 and indented subclass.
- 51** This subclass is indented under subclass 50. Apparatus in which no raceplate or similar fixed guiding means is provided and the carriers are clutched or clamped to the propelling devices during travel between points of transfer from one propelling device to another.
- 52** This subclass is indented under the class definition. Apparatus in which means are provided for forming the lace-like fabric of knotted or looped form commonly known as tatting.

- (1) Note. This subclass includes manual means enabling or assisting the operator to form the loops, through which the tatting shuttle is passed, in hand tatting.
- 53** This subclass is indented under the class definition. Apparatus in which net or mesh fabrics are produced by tying knots in strands at their points of juncture.
- (1) Note. This subclass is distinguished from subclass 52 in that those devices are for making a lace-like fabric of predetermined design while these are for making regular mesh net-like fabrics, such as, for example, seines.
- (2) Note. Search Class: 289, Knots and Knot Tying, for knot tyers, per se.
- 54** This subclass is indented under the class definition. Apparatus for carrying bobbins or spools of strand material movably in the formation of fabrics.
- (1) Note. Devices for applying bobbins to carriers or shuttles, and for removing them therefrom, as well as devices for placing strands through shuttle eyes or guides, are in this subclass (54).
- 55** This subclass is indented under subclass 54. Apparatus for carrying bobbins or spools used on braiding machines.
- 56** This subclass is indented under subclass 55. Apparatus provided with means to apply tension to strands leading from the carrier.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
61, for miscellaneous tension devices.
- 57** This subclass is indented under subclass 56. Apparatus in which the tension is imposed by means retarding or opposing the rotations of the spool or bobbin mounted on the carrier.
- (1) Note. For let-offs operated or controlled in their operation by changing tension in the strands, see subclasses 21 and 22.
- 58** This subclass is indented under subclass 54. Apparatus designed for use in forming tatting, usually manually operated, and often provided with hooks and the like to assist the operator in making loops.
- 59** This subclass is indented under subclass 58. Apparatus having means to wind strand material on the bobbin without removing the same from the shuttle.
- SEE OR SEARCH CLASS:
242, Winding, Tensioning, or Guiding, subclass 472 for a device for winding strand onto a hand tool such as a shuttle.
- 60** This subclass is indented under subclass 54. Apparatus consisting of manual implements usually provided with means to hold a supply of strand material and used in forming seines and other knotted fabrics.
- 61** This subclass is indented under the class definition. Miscellaneous strand tensioning devices for apparatus coming .
- SEE OR SEARCH THIS CLASS, SUBCLASS:
56+, for braiding carriers with strand tensioning means.
- SEE OR SEARCH CLASS:
66, Textiles: Knitting, subclass 146 for strand tensioners combined with knitting machines.
226, Advancing Material of Indeterminate Length, subclass 195 for devices for placing tension on material of indeterminate-length.
242, Winding, Tensioning, or Guiding, subclasses 410+ for tension running material.
- 62** This subclass is indented under the class definition. Apparatus not particularly provided for above.
- END